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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/526,957 03/16/00 SEBESTA

R EN9-98-141

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MMC2/0705

EXAMINER

MITCHEL	J.T.
ART UNIT	PAPER NUMBER

2822

DATE MAILED:

07/05/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

<b>Office Action Summary</b>	Application No.	Applicant(s)
	09/526,957	SEBESTA ET AL.
	Examiner	Art Unit
	James Mitchell	2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 05 April 2001.

2a) This action is FINAL.      2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-13 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) Claim(s) \_\_\_\_\_ is/are allowed.

6) Claim(s) 1-13 is/are rejected.

7) Claim(s) \_\_\_\_\_ is/are objected to.

8) Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.

11) The proposed drawing correction filed on \_\_\_\_\_ is: a) approved b) disapproved.

12) The oath or declaration is objected to by the Examiner.

#### Priority under 35 U.S.C. § 119

13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some \* c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

14) Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

#### Attachment(s)

15)  Notice of References Cited (PTO-892)      18)  Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_

16)  Notice of Draftsperson's Patent Drawing Review (PTO-948)      19)  Notice of Informal Patent Application (PTO-152)

17)  Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_      20)  Other: \_\_\_\_\_

## DETAILED ACTION

1. This office is in response to the amendment filed April 5,2001.

### *Drawings*

2. The proposed drawing correction and/or the proposed substitute sheets of drawings filed on April 5,2001 have been approved.

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-4, and 6-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Furukawa (JP 10032371).

5. Furukawa discloses (Fig. 24) substrate (13), first conductive pad (Items 23 A, B) located at bottom of Plated Through Hole (19) consisting of first thickness which is made of layers 19 and 3B, second conductive pad (Item 25) located at top of Plated Through Hole (PTH) with a second thickness made of layers 7,3A and 19; a first and second circuit line in mechanical and electrical contact on opposite surfaces by PTH (19) and on the same surface (Figures 26A,B, Items 25A,B and 23A,B); a third line (Figure 26A,B, Item J) of a third thickness coupled to a first and second circuit line (Furukawa, Paragraph 0032); an end of the first circuit line (23A) includes a first conductive pad and end of the second line (25A) includes a second conductive pad (Figure 26A).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

8. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 5 rejected under 35 U.S.C. 103(a) as being unpatentable over Furukawa as applied to claims 1-4, and 6-8 and further in view of Frey et al. (U.S 5,249,101).

10. Frey utilizes a protective coating (Lines 49-54, Column 3). It would have been obvious to incorporate a protective coating on the circuit patterns of Furukawa to protect the circuitry from mechanical and environmental hazards.

11. Claims 9,10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furukawa as applied to claims 1-4,6-8 and further in view of Nishiguchi et al. (U.S 5,214,308).

12. Furukawa does not show first and second solder balls with unequal diameters, but Nishiguchi utilizes first and second solder with unequal diameters (Figure 7).

13. It would have been obvious to one of ordinary skill in the art to combine with the thick and thin pads of Furukawa, solder balls of varying diameters to form strong mechanical and electrical connections with smaller or larger contacts without damage to the device.

14. Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Furukawa as applied to claims 1-4,6-8 and further in view of Haji (U.S 5,767,008) and Bertin et al. (U.S 5,977,640).

15. Furukawa does not disclose metal layers, wire bond interconnect or solder ball coupled to Electronic carrier, however Haji utilizes contact pad comprising copper, nickel barrier layer, and gold top layer (Lines 34-5, Column 5-6), but does not disclose a wire bond with solder ball interconnect.

16. Bertin utilizes wire bond interconnect to pad (Fig. 5) and electronic carrier coupled to solder ball.

17. Although a solder ball connected to a pad is not shown, it would have been obvious to one of ordinary skill in the art to use a pad with solder balls since it is a conventional method for forming a mechanical and electrical connection with substrate.

18. Further, it would have been obvious to one of ordinary skill in the art to combine Furukawa's pad with Haji's metal layer pad and Bertin's wire and solder ball interconnect for increased device density and electrical contact.

***Response to Amendment***

19. Applicant's argument filed April 5,2001 have been fully considered but are not found to be persuasive.

20. Applicant contends that prior art does not disclose a first circuit line with a first pad of first thickness that is electrically and mechanically coupled to a second line and pad with second thickness, a third circuit line, or a first and second circuit line with conductive pads attached to their ends.

21. Referring to Figure 24, a copper plated through hole (19) is shown, electrically and mechanically connecting thick pad circuit pattern (top of PTH) and thin pad circuit pattern (bottom of PTH). Inherently copper possesses conductive properties, as such any electrical contact made to the first circuit line will be electrically coupled to second circuit line. Further, if the top circuit line is moved, it will shift the corresponding bottom circuit line, as proven by their physical attachment.

22. Applicant's reliance on prior art's abstract stating that circuit lines are "on" an insulated substrate does not in itself, prove lack of electrical contact between circuit lines. Both lines are shown in the prior art to be connected on the same surface (Figures 26A,B) and on opposite surfaces (Figure 24).

23. As for the remaining issue of pads being attached to the end of each circuit line, and a third circuit line of different thickness. Figure 26 (B), shows a first and second circuit line mechanically (physically) coupled to a substrate, wherein each line has at its end, a pad.

24. Section J of Figure 26A and B shows an area decreasing in width between the thick and thin regions of 25A,B and 23A,B. The section can be interpreted as multiple

line portions (3<sup>rd</sup> and 4<sup>th</sup> etc. lines) having varying thickness. The claimed limitations as set forth have been met.

***Conclusion***

25. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (703) 308-4083. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3230 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

jmm  
June 26, 2001

*Carl Whitehead Jr.*  
CARL WHITEHEAD, JR.  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800